

DESC FORM 193
SEP 87
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5962-E659

1. SCOPE

1.1 Scope. This drawing describes device requirements for class B microcircuits in accordance with 1.2.1 of MIL-STD-883, "Provisions for the use of MIL-STD-883 in conjunction with compliant non-JAN devices".

1.2 Part or Identifying Number (PIN). The complete PIN shall be as shown in the following example:

<u>5962-87753</u>	<u>01</u>	<u>E</u>	<u>X</u>
Drawing number	Device type (see 1.2.1)	Case outline (see 1.2.2)	Lead finish per MIL-M-38510

1.2.1 Device type. The device type shall identify the circuit function as follows:

<u>Device type</u>	<u>Generic number</u>	<u>Circuit function</u>
01	14551B	Analog multiplexer/demultiplexer four-pole, double-throw

1.2.2 Case outlines. The case outlines shall be as designated in appendix C of MIL-M-38510, and as follows:

<u>Outline letter</u>	<u>Case outline</u>
E	D-2 (16-lead, .840" x .310" x .200"), dual-in-line package

1.3 Absolute maximum ratings.

Supply voltage range (V_{DD})	-0.5 V dc to +18.0 V dc
Input voltage range	-0.5 V dc to $V_{DD} + 0.5$ V dc
Input current (DC or transient), per control pin	± 10 mA
Switch through current	± 25 mA
Storage temperature range	-65° C to +150° C
Maximum power dissipation (P_D) ^{1/}	500 mW
Lead temperature (soldering, 10 seconds)	+260° C
Thermal resistance, junction-to-case (Θ_{JC}):	
Case E	See MIL-M-38510, appendix C
Junction temperature (T_J)	+175° C

1.4 Recommended operating conditions.

Supply voltage (V_{DD})	+3.0 V dc to +15.0 V dc
Case operating temperature range (T_C)	-55° C to +125° C
Peak-to-peak voltage into or out of the switch	0- V_{DD}
Static or dynamic voltage across the switch	0-600 mV

^{1/} For $T_C = +100^\circ\text{C}$ to $+125^\circ\text{C}$, derate linearly at 12 mW/°C to 200 mW.

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2. APPLICABLE DOCUMENTS

2.1 Government specification, standard, and bulletin. Unless otherwise specified, the following specification, standard, and bulletin of the issue listed in that issue of the Department of Defense Index of Specifications and Standards specified in the solicitation, form a part of this drawing to the extent specified herein.

SPECIFICATION

MILITARY

MIL-M-38510 - Microcircuits, General Specification for.

STANDARD

MILITARY

MIL-STD-883 - Test Methods and Procedures for Microelectronics.

(Copies of the specification and standard required by manufacturers in connection with specific acquisition functions should be obtained from the contracting activity or as directed by the contracting activity.)

2.2 Order of precedence. In the event of a conflict between the text of this drawing and the references cited herein, the text of this drawing shall take precedence.

3. REQUIREMENTS

3.1 Item requirements. The individual item requirements shall be in accordance with 1.2.1 of MIL-STD-883, "Provisions for the use of MIL-STD-883 in conjunction with compliant non-JAN devices" and as specified herein.

3.2 Design, construction, and physical dimensions. The design, construction, and physical dimensions shall be as specified in MIL-M-38510 and herein.

3.2.1 Terminal connections. The terminal connections shall be as specified on figure 1.

3.2.2 Truth table. The truth table shall be as specified on figure 2.

3.2.3 Case outline. The case outline shall be in accordance with 1.2.2 herein.

3.3 Electrical performance characteristics. Unless otherwise specified herein, the electrical performance characteristics are as specified in table I and apply over the full case operating temperature range.

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TABLE I. Electrical performance characteristics.

Test	Symbol	Conditions $-55^{\circ}\text{C} \leq T_C \leq +125^{\circ}\text{C}$ 1/		Group A subgroups	Limits		Unit
					Min	Max	
High level input voltage	V_{IH}		$V_{DD} = 5.0\text{ V}$	1, 2, 3	3.5		V
			$V_{DD} = 10.0\text{ V}$		7.0		
			$V_{DD} = 15.0\text{ V}$		11.0		
Low level input voltage	V_{IL}		$V_{DD} = 5.0\text{ V}$	1, 2, 3		1.5	V
			$V_{DD} = 10.0\text{ V}$			3.0	
			$V_{DD} = 15.0\text{ V}$			4.0	
"ON" resistance	R_{ON}	$V_{SWITCH} \leq 500\text{ mW}$ $V_{IN} = V_{IL}\text{ or }V_{IH}$ (pin 9); $V_{IN} = 0\text{ V to }V_{DD}$ (switch)	$V_{DD} = 5.0\text{ V}$	1		1050	Ω
				2		1300	
				3		800	
			$V_{DD} = 10.0\text{ V}$	1		500	
				2		550	
				3		400	
			$V_{DD} = 15.0\text{ V}$	1		280	
				2		320	
				3		220	

See footnotes at end of table.

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TABLE I. Electrical performance characteristics - Continued.

Test	Symbol	Conditions $-55^{\circ}\text{C} \leq T_C \leq +125^{\circ}\text{C}$ 1/		Group A subgroups	Limits		Unit
					Min	Max	
"ON" resistance between any two channels in the same package	R_{ON}	$T_C = +25^{\circ}\text{C}$ $T_C = -55^{\circ}\text{C}$	$V_{\text{DD}} = 5.0\text{ V}$	1, 3		70	Ω
		$T_C = +125^{\circ}\text{C}$		2		135	
		$T_C = +25^{\circ}\text{C}$ $T_C = -55^{\circ}\text{C}$	$V_{\text{DD}} = 10.0\text{ V}$	1, 3		50	
		$T_C = +125^{\circ}\text{C}$		2		95	
		$T_C = +25^{\circ}\text{C}$ $T_C = -55^{\circ}\text{C}$	$V_{\text{DD}} = 15.0\text{ V}$	1, 3		45	
		$T_C = +125^{\circ}\text{C}$		2		65	
Control input leakage current	I_{IN}	$V_{\text{IN}} = V_{\text{DD}}$ or 0.0 V	$V_{\text{DD}} = 15.0\text{ V}$	1, 2, 3		± 1	μA
Quiescent current per package	I_{DD}	$V_{\text{IN}} = V_{\text{SS}}$ or V_{DD} $V_{\text{EE}} \leq V_{\text{IO}} \leq V_{\text{DD}}$ $V_{\text{SWITCH}} \leq 500\text{ mW}$	$V_{\text{DD}} = 5.0\text{ V}$	1, 2, 3		150	μA
			$V_{\text{DD}} = 10.0\text{ V}$			300	
			$V_{\text{DD}} = 15.0\text{ V}$			600	
"OFF" channel leakage current	I_{OFF}	$V_{\text{IN}} = V_{\text{IL}}$ or V_{IH} $T_C = +25^{\circ}\text{C}, -55^{\circ}\text{C}$	$V_{\text{DD}} = 15.0\text{ V}$	1, 3		± 100	nA
		$V_{\text{IN}} = V_{\text{IL}}$ or V_{IH} $T_C = +125^{\circ}\text{C}$		2		± 1000	

See footnotes at end of table.

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TABLE I. Electrical performance characteristics - Continued.

Test	Symbol	Conditions -55° C ≤ T _C ≤ +125° C <u>1/</u>		Group A subgroups	Limits		Unit
					Min	Max	
Input capacitance	C _{IN}	T _C = +25° C, see 4.3.1c		4		7.5	pF
Functional tests		See 4.3.1d		7			
Propagation delay time, switch input to switch output <u>1/</u>	t _{PHL1} , t _{PLH1}	R _L = 10 kΩ C _L = 50 pF ±10% V _{EE} ≤ V _{SS} See figure 3	V _{DD} = 5.0 V	9, 10, 11		90	ns
			V _{DD} = 10.0 V			40	
			V _{DD} = 15.0 V			30	
Propagation delay time, control input to output	t _{PHL2} , t _{PLH2}	R _L = 10 kΩ C _L = 50 pF ±10% V _{EE} ≤ V _{SS} See figure 3	V _{DD} = 5.0 V	9, 10, 11		875	
			V _{DD} = 10.0 V			350	
			V _{DD} = 15.0 V			250	

1/ For $V_{DD} = 5.0\text{ V}$ dc, $t_{PLH}, t_{PHL} = (0.17\text{ ns/pF})C_L + 26.5\text{ ns}$;
 For $V_{DD} = 10.0\text{ V}$ dc, $t_{PLH}, t_{PHL} = (0.08\text{ ns/pF})C_L + 11.0\text{ ns}$; and
 For $V_{DD} = 15.0\text{ V}$ dc, $t_{PLH}, t_{PHL} = (0.06\text{ ns/pF})C_L + 9.0\text{ ns}$

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	Terminal symbol
Device	01
Case	E
Terminal number	
1	W1
2	X0
3	X1
4	X
5	Y
6	Y0
7	V _{EE}
8	V _{SS}
9	Control
10	Y1
11	Z0
12	Z1
13	Z
14	W
15	W0
16	V _{DD}

FIGURE 1. Terminal connections.

Control	ON
0	W0 X0 Y0 Z0
1	W1 X1 Y1 Z1

FIGURE 2. Truth table.

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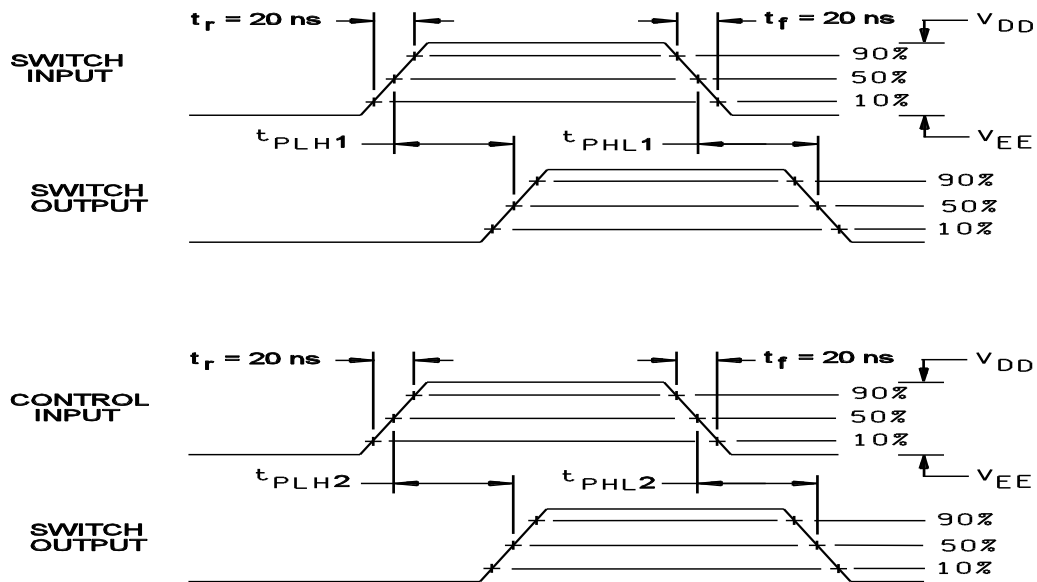


FIGURE 3. Switching time waveforms.

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3.4 Marking. Marking shall be in accordance with MIL-STD-883 (see 3.1 herein). The part shall be marked with the part number listed in 1.2 herein. In addition, the manufacturer's part number may also be marked as listed in 6.4 herein.

3.5 Certificate of compliance. A certificate of compliance shall be required from a manufacturer in order to be listed as an approved source of supply in 6.4. The certificate of compliance submitted to DESC-ECS prior to listing as an approved source of supply shall state that the manufacturer's product meets the requirements of MIL-STD-883 (see 3.1 herein) and the requirements herein.

3.6 Certificate of conformance. A certificate of conformance as required in MIL-STD-883 (see 3.1 herein) shall be provided with each lot of microcircuits delivered to this drawing.

3.7 Notification of change. Notification of change to DESC-ECS shall be required in accordance with MIL-STD-883 (see 3.1 herein).

3.8 Verification and review. DESC, DESC's agent, and the acquiring activity retain the option to review the manufacturer's facility and applicable required documentation. Offshore documentation shall be made available onshore at the option of the reviewer.

4. QUALITY ASSURANCE PROVISIONS

4.1 Sampling and inspection. Sampling and inspection procedures shall be in accordance with section 4 of MIL-M-38510 to the extent specified in MIL-STD-883 (see 3.1 herein).

4.2 Screening. Screening shall be in accordance with method 5004 of MIL-STD-883, and shall be conducted on all devices prior to quality conformance inspection. The following additional criteria shall apply:

a. Burn-in test, method 1015 of MIL-STD-883:

(1) Test condition A, B, C, or D using the circuit submitted with the certificate of compliance (see 3.5 herein).

(2) $T_A = +125^{\circ}\text{C}$, minimum.

b. Interim and final electrical test parameters shall be as specified in table II herein, except interim electrical parameter tests prior to burn-in are optional at the discretion of the manufacturer.

4.3 Quality conformance inspection. Quality conformance inspection shall be in accordance with method 5005 of MIL-STD-883 including groups A, B, C, and D inspections. The following additional criteria shall apply.

4.3.1 Group A inspection.

a. Tests shall be as specified in table II herein.

b. Subgroups 5, 6, and 8 in table I, method 5005 of MIL-STD-883 shall be omitted.

c. Subgroup 4 (C_{IN} measurement) shall be measured only for the initial test and after process or design changes which may affect input capacitance.

d. Subgroup 7 tests sufficiently to verify truth table.

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TABLE II. Electrical test requirements.

MIL-STD-883 test requirements	Subgroups (per method 5005, table I)
Interim electrical parameters (method 5004)	1
Final electrical test parameters (method 5004)	1*, 2, 3, 7, 9
Group A test requirements (method 5005)	1, 2, 3, 4, 7, 9, 10, 11**
Groups C and D end-point electrical parameters (method 5005)	1, 2, 3

* PDA applies to subgroups 1.

** Subgroups 10 and 11, if not tested, shall be guaranteed to the specified limits in table I.

4.3.2 Groups C and D inspections.

- a. End-point electrical parameters shall be as specified in table II herein.
- b. Steady-state life test conditions, method 1005 of MIL-STD-883:
 - (1) Test condition A, B, C, or D using the circuit submitted with the certificate of compliance (see 3.5 herein).
 - (2) $T_A = +125^\circ\text{C}$, minimum.
 - (3) Test duration: 1,000 hours, except as permitted by method 1005 of MIL-STD-883.

5. PACKAGING

5.1 Packaging requirements. The requirements for packaging shall be in accordance with MIL-M-38510.

6. NOTES

6.1 Intended use. Microcircuits conforming to this drawing are intended for use when military specifications do not exist and qualified military devices that will perform the required function are not available for OEM application. When a military specification exists and the product covered by this drawing has been qualified for listing on QPL-38510, the device specified herein will be inactivated and will not be used for new design. The QPL-38510 product shall be the preferred item for all applications.

6.2 Replaceability. Microcircuits covered by this drawing will replace the same generic device covered by a contractor-prepared specification or drawing.

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6.3 Comments. Comments on this drawing should be directed to DESC-ECS, Dayton, Ohio 45444, or telephone (513) 296-5375.

6.4 Approved source of supply. An approved source of supply is listed herein. Additional sources will be added as they become available. The vendor listed herein has agreed to this drawing and a certificate of compliance (see 3.5 herein) has been submitted to DESC-ECS.

Military drawing part number	Vendor CAGE number	Vendor similar part number <u>1/</u>	Replacement military specification part number
5962-8775301EX	04713	14551B/BEAJC	

1/ Caution. Do not use this number for item acquisition. Items acquired to this number may not satisfy the performance requirements of this drawing.

Vendor CAGE
number

04713

Vendor name
and address

Motorola, Inc.
7402 South Price Road
Tempe, AZ 85283

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